Development of an automatic drowsiness monitoring system based on EEG and EOG signals, and preliminary tests in a professional driving simulator

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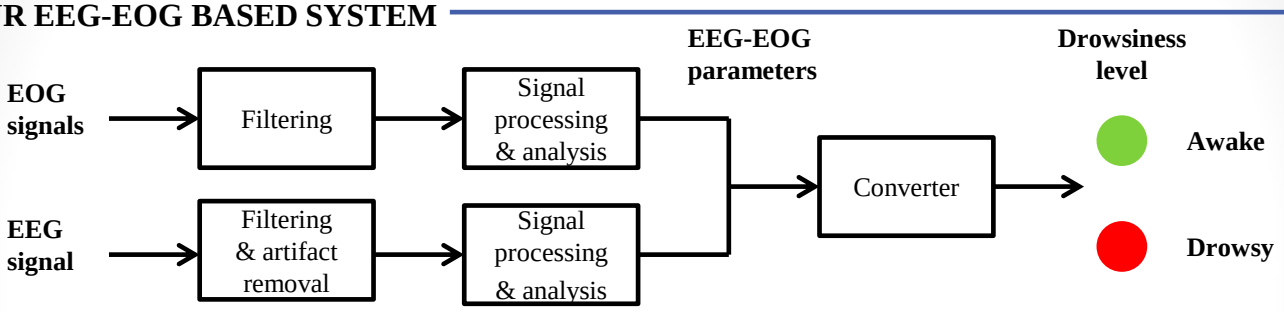
PROBLEM

- **1/3 of fatal accidents on highways** [1]
- **100,000 crashes per year in USA** [2]
- **6-11% of the population suffer from Excessive Daytime Sleepiness (EDS)** [3]

DROWSINESS MONITORING SYSTEMS

Major issue: Validation
"Gold standard" = EEG + EOG

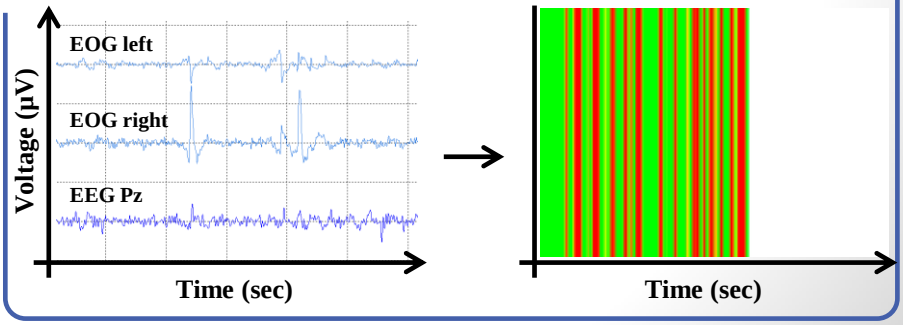
OUR EEG-EOG BASED SYSTEM



Primary application: Validation; Secondary application: Real-time monitoring

EXPERIMENTAL SETUP

PRELIMINARY RESULTS



DEMAND AND MARKET

- **Demand: ASAF, ITSRE, Caterpillar,…**
- **Market: 1,000,000 trucks in EU and 2,000,000 trucks in USA**

ACKNOWLEDGMENTS

- **Financial support: Région Wallonne**
- **Test lab: Sleep Laboratory (CETES), University Hospital of Liège**
- **Driving simulator: IFSTTAR**

REFERENCES

[1] Association des Sociétés Françaises d'Autoroute, "*Somnolence au volant – Une étude pour mieux comprendre*", juin 2010.
[2] Denso, http://www.densocorp-na.com/news/pr.php?Action=459, accessed 04/14/2010.
[3] M.F. Vecchierini and D. Léger, "La somnolence diurne excessive et les hypersomnies centrales primaires: données épidémiologiques," *Médecine du sommeil*, vol. 7, 2010, pp. 129-138.

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